[0782] In some embodiments, the medical pump device may communicate with a handheld device by utilizing a camera that is included in the handheld device. More specifically, the camera of the handheld device may be configured to detect a visual modulation signal. In some embodiments, the visual modulation signal may come from a dome light included in the medical pump device. The handheld device may use the visual modulation signal to determine a number of infusion sets that has been administered by the medical pump device.

[0783] Various alternatives and modifications can be devised by those skilled in the art without departing from the disclosure. Accordingly, the present disclosure is intended to embrace all such alternatives, modifications and variances. Additionally, while several embodiments of the present disclosure have been shown in the drawings and/or discussed herein, it is not intended that the disclosure be limited thereto, as it is intended that the disclosure be as broad in scope as the art will allow and that the specification be read likewise. Therefore, the above description should not be construed as limiting, but merely as exemplifications of particular embodiments. And, those skilled in the art will envision other modifications within the scope and spirit of the claims appended hereto. Other elements, steps, methods and techniques that are insubstantially different from those described above and/or in the appended claims are also intended to be within the scope of the disclosure.

[0784] The embodiments shown in the drawings are presented only to demonstrate certain examples of the disclosure. And, the drawings described are only illustrative and are non-limiting. In the drawings, for illustrative purposes, the size of some of the elements may be exaggerated and not drawn to a particular scale. Additionally, elements shown within the drawings that have the same numbers may be identical elements or may be similar elements, depending on the context.

[0785] Where the term "comprising" is used in the present description and claims, it does not exclude other elements or steps. Where an indefinite or definite article is used when referring to a singular noun, e.g., "a," "an," or "the," this includes a plural of that noun unless something otherwise is specifically stated. Hence, the term "comprising" should not be interpreted as being restricted to the items listed thereafter; it does not exclude other elements or steps, and so the scope of the expression "a device comprising items A and B" should not be limited to devices consisting only of components A and B. This expression signifies that, with respect to the present disclosure, the only relevant components of the device are A and B.

[0786] Furthermore, the terms "first," "second," "third," and the like, whether used in the description or in the claims, are provided for distinguishing between similar elements and not necessarily for describing a sequential or chronological order. It is to be understood that the terms so used are interchangeable under appropriate circumstances (unless clearly disclosed otherwise) and that the embodiments of the disclosure described herein are capable of operation in other sequences and/or arrangements than are described or illustrated herein.

What is claimed is:

1. A system for regulating fluid flow having a processor configured to reduce image noise, the system comprising:
   an image sensor configured to capture an image of a drip chamber, wherein the processor is configured to:
      capture the image of the drip chamber using the image sensor,
      perform an edge detection on the image to generate a first processed image, and
      perform an AND-operation on a pixel on a first side of an axis of the first processed image with a corresponding mirror pixel on a second side of the axis of the first processed image to generate a second processed image.

2. The system according to claim 1, wherein the edge detection is performed using a canny edge detection.

3. The system according to claim 1, wherein the processor is configured to match a template to the image.

4. The system of claim 3, wherein the template includes at least a partial image of a drop of the fluid forming within the drip chamber.

5. The system of claim 1, wherein the processor is configured to apply a blurring function to the image captured by the image sensor of the drip chamber.

6. The system according to claim 5, wherein the blurring function is a low pass filter.

7. The system according to claim 5, wherein the blurring function is configured to blur in a vertical direction.

8. The system according to claim 5, wherein the blurring function is configured to blur in a horizontal direction.

9. The system according to claim 5, wherein the blurring function is a one-dimensional Gaussian Blur function.

10. The system according to claim 5, wherein the blurring function is a two-dimensional Gaussian Blur function.

11. A method for reducing image noise, the method comprising:
   capturing an image of a drip chamber;
   applying a blurring function to the image of the drip chamber; and
   performing an AND-operation on a pixel on a first side of an axis of a first processed image with a corresponding mirror pixel on a second side of the axis of the first processed image to generate a second processed image.

12. The method according to claim 11, further comprising performing a canny edge detection.

13. The method according to claim 11, further comprising matching a template to the image.

14. The method according to claim 13, wherein the template includes at least a partial image of a drop of the fluid forming within the drip chamber.

15. The method according to claim 11, wherein the blurring function is a low pass filter.

16. The method according to claim 11, wherein the act of applying the blurring function comprises blurring in a vertical direction.

17. The method according to claim 11, wherein the act of applying the blurring function comprises blurring in a horizontal direction.

18. The method according to claim 11, wherein the blurring function is a one-dimensional Gaussian Blur function.

19. The method according to claim 11, wherein the blurring function is a two-dimensional Gaussian Blur function.

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